

REMARKS

Applicants respectfully request reconsideration of the present application in view of the foregoing amendments and in view of the reasons that follow.

The specification has been amended on pages 1 and 2.

This amendment adds, changes and/or deletes claims in this application. A detailed listing of all claims that are, or were, in the application, irrespective of whether the claim(s) remain under examination in the application; is presented, with an appropriate defined status identifier.

After amending the claims as set forth above, claims 1-13 are now pending in this application.

Rejections under 35 U.S.C. § 103

Claims 1, 2, and 7-13 are rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,039,007 (hereafter "Ban et al.") in view of U.S. Patent No. 5,683,031 (hereafter "Sanger"). This rejection is respectfully traversed.

Claim 1 recites a heating device for a motor vehicle that includes an internal combustion engine and an engine coolant circuit, wherein the heating device comprises a housing defining a heat generation chamber, a rotor mounted in the heat generation chamber for rotation on a drive shaft, a cooling jacket defining a cooling chamber in heat exchange relationship with the heat generation chamber, where the cooling chamber is adapted for circulating the engine coolant and includes a coolant inlet and a coolant outlet, and a pump wheel driven by the drive shaft and arranged in the cooling chamber for circulating the coolant.

Ban et al. discloses a viscous fluid heater that includes a heating chamber 7 defined by a front partition plate 5 and a rear partition plate 6. See Ban et al. at col. 3, lines 4-11. A rotor 14 rotates within the heating chamber 7 to shear oil within the heating chamber 7 and generate heat, which is transferred to coolant flowing in a front water jacket 8 and a rear water jacket 9 adjacent to the heating chamber 7. See Ban et al. at col. 6, lines 32-36. The front water jacket 8 and the rear water jacket 9 are formed by a front partition plate 5 and a

rear partition plate 6, which form guide fins 5c, 6c within the water jackets 8, 9 for guiding coolant flowing in the water jackets 8, 9. See Ban et al. at col. 3, lines 14-40. However, Ban et al. does not disclose or suggest “wherein a pump wheel driven by the drive shaft is arranged in the cooling chamber for circulating the coolant.”

Sanger discloses a heat generator that includes a stator 52 and a rotor 54 that pass fluid in a toroidal path between buckets of the stator 52 and rotor 54 to generate heat. See Sanger at col. 3, lines 4-5; col. 4, lines 7-23. Therefore, the stator 52 and rotor 54 create a heat generation chamber. Sanger further discloses a centrifugal pump 90 that is carried on the rotor 54 for pumping fluid from conduit 88 to chamber 91, passage 92, passage 94, and then to short passages 96 that supply the fluid to the stator buckets. See Sanger at col. 3, lines 31-39. However, Sanger does not disclose or suggest a cooling jacket around the heat generation chamber in which coolant flows. Conduit 88, chamber 91, passage 92, passage 94, and short passages 96 do not form a cooling jacket. In light of this, the centrifugal pump 90 disclosed by Sanger is not arranged in a cooling chamber.

It would not have been obvious to one of ordinary skill in the art at the time Applicants’ invention was made to modify the heater disclosed by Ban et al. by the teachings of Sanger to make the claimed heating device. Because Sanger discloses that centrifugal pump 90 is carried by rotor 54, thus causing centrifugal pump 90 to rotate and pump fluid, one of ordinary skill would understand that modifying the heater of Ban et al. by the teachings of Sanger would entail attaching the centrifugal pump 90 to the rotor 14 disclosed by Ban et al. This would arrange the centrifugal pump 90 within the heating chamber 7 instead of either water jacket 8, 9. It would not have been obvious to arrange the centrifugal pump 90 in either water jacket 8, 9 of the heater of Ban et al. because the centrifugal pump 90 would not be carried on a rotor because water jackets 8, 9 are separate from the heating chamber. Therefore, if the centrifugal pump 90 were arranged in either water jacket 8, 9 it would not rotate and function to pump fluid, as taught by Sanger.

Furthermore, it would not have been obvious to arrange the centrifugal pump 90 in either water jacket 8, 9 because water jackets 8, 9 are defined by fins 5c, 6c, as shown in Figure 1 of Ban et al. These fins 5c, 6c guide coolant flowing in the water jackets 8, 9, as taught by Ban et al. As shown by Figure 4 of Ban et al. and Figure 4 of Sanger, the fins 5c, 6c

have a significantly different design than the centrifugal pump 90. As shown in Figure 4 of Ban et al., the fins 5c, 6c function to guide coolant from the inlet port to the outlet port. Therefore, arranging the centrifugal pump 90 in either water jacket 8, 9 would interfere with the fins 5c, 6c and change the principle of operation of the heater disclosed by Ban et al. See M.P.E.P. § 2143.01.

Furthermore, one of ordinary skill in the art would not have been motivated to modify the heater of Ban et al. by the teachings of Sanger. The Office Action states on page 2 that one of ordinary skill would have been motivated to make such modifications for the purpose of space conservation. However, the Office does not explain how the addition of a new component, the centrifugal pump 90, to the heater of Ban et al. would result in space conservation, particularly if the centrifugal pump 90 were to be added to any of the heating chamber 7 or the water jackets 8, 9 of Ban et al. Withdrawal of this rejection is respectfully requested.

Claim 2 depends upon claim 1 and is allowable over the combination of Ban et al. and Sanger for at least the reasons noted above. Claim 2 further recites "...wherein the cooling jacket has a central protuberance which is arranged coaxially to the drive shaft and outside which the pump wheel is arranged and inside which a shaft stub of the drive shaft is arranged." In regard to claim 2, the Office refers to "15" on page 2 of the Office Action. Ban et al. discloses a bolt 15 that secures a pulley 16 to a front end of a drive shaft 13. See Ban et al. at col. 3, lines 64-65. Bolt 15 is not a central protuberance of a cooling jacket. Nor does Ban et al. disclose or suggest a central protuberance for water jackets 8, 9. Sanger does not disclose an item 15, nor does Sanger disclose or suggest a cooling jacket. Therefore, the combination of Ban et al. and Sanger fails to disclose or suggest the features recited by claim 2. Withdrawal of this rejection is respectfully requested.

Claims 3-5 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Ban et al. in view of Sanger and in further view of U.S. Patent No. 4,308,994 (hereafter "Perhats"). This rejection is respectfully traversed. Perhats discloses a vehicle circulation system that includes a radiator 1 with a hot water circuit 2 and a cold water return circuit 3; hot water transmitting conduits 6, 8; and a circulation device 7 interposed between hot water transmitting conduit 6 and hot water transmitting conduit 8. See Perhats at col. 6, lines 1-4,

17-21. Perhats discloses that the circulation device 7 is an integrated pump motor device that includes an impeller blade 16 that revolves due to the magnetic interaction of yoke 20 and the magnetic base 23 of the impeller blade 16. See Perhats at col. 6, lines 63-68. However, the impeller blade 16 is not arranged in a coolant chamber because the circulation device 7 is arranged within the hot water transmitting circuit of the circulation system. Therefore, Perhats does not cure the deficiencies of Ban et al. and Sanger. Withdrawal of this rejection is respectfully requested.

Allowable Subject Matter

Applicants wish to thank the Office for indicating that claim 6 contains allowable subject matter.

Applicants believe that the present application is now in condition for allowance. Favorable reconsideration of the application as amended is respectfully requested.

The Examiner is invited to contact the undersigned by telephone if it is felt that a telephone interview would advance the prosecution of the present application.

The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 19-0741. Should no proper payment be enclosed herewith, as by a check or credit card payment form being in the wrong amount, unsigned, post-dated, otherwise improper or informal or even entirely missing, the Commissioner is authorized to charge the unpaid amount to Deposit Account No. 19-0741. If any extensions of time are needed for timely acceptance of papers submitted herewith, Applicant hereby petitions for such extension under 37 C.F.R. §1.136 and authorizes payment of any such extensions fees to Deposit Account No. 19-0741.

Respectfully submitted,

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